3-D Viscoelastic FEM Modeling of Crustal Deformation in Northeast Japan: Vertical Displacement since 1900

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As a first step toward establishing a standard earthquake cycle model in Japan, we simulate the crustal deformation during the past 100 years in Northeast Japan, using a 3-D viscoelastic FEM based on the kinematic earthquake cycle model. Then, we compare the computed results with observed long-term leveling data. On the whole, although the effect of the subducting PAC is dominant, coseismic deformation of the interplate earthquakes can be clearly seen in the inland. Moreover, the postseismic deformation of the earthquakes due to the viscoelastic upper mantle seriously affects the inland movements, and continues for a few decades. Our modeling including the effect of the interplate earthquakes and the three-dimensional viscoelastic inhomogeneity, fairly explains the observed data.